

CLAIMS

1. An ignition coil for an internal combustion engine comprising:
a housing having a bottom wall connected to an outer wall extending around the periphery of the housing;
an outer core positioned inside the outer wall of the housing;
an inner core positioned inside the outer core;
a coil assembly mounted to the inner core, the coil assembly including a primary winding and a secondary winding concentrically positioned relative to each other, the coil assembly positioned inside the outer core; and
the housing further having an inner wall extending along the inner periphery of the outer core and positioned between the outer core and the coil assembly.
2. The ignition coil of claim 1, further comprising an encapsulate filling at least a portion of the housing and covering the coil assembly, the inner wall separating the outer core from direct contact with encapsulate in the vicinity of the coil assembly.
3. The ignition coil of claim 2, wherein the inner wall defines an inner compartment, and wherein the inner and outer walls define an outer compartment therebetween, the inner chamber being filled with encapsulate.
4. The ignition coil of claim 3, wherein the outer compartment is filled with a substance different than the encapsulate.

5. The ignition coil of claim 4, wherein the outer compartment is filled with air.
6. The ignition coil of claim 4, wherein the outer compartment is filled with a substance having more ductility than the encapsulate.
7. The ignition coil of claim 1, wherein the inner wall extends between the inner core and the outer core to form an air gap therebetween.
8. The ignition coil of claim 7, wherein the inner core includes first and second ends, each end positioned proximate the outer core, and wherein the inner wall extends between the first end of the inner core and the outer core to form the air gap.
9. The ignition coil of claim 8, wherein the inner wall also extends between the second end of the inner core and the outer core.
10. The ignition coil of claim 8, wherein the first end of the inner core includes a permanent magnet attached thereto and engaging an inner surface of the outer core, the first end and magnet extending through an aperture formed in the inner wall.

11. The ignition coil of claim 8, wherein the inner wall includes a reduced thickness portion positioned adjacent the first end of the inner core, the reduced thickness portion forming the air gap.

12. The ignition coil of claim 8, wherein the inner wall includes a permanent magnet integrally formed therein, the permanent magnet positioned adjacent the first end of the inner core.

13. The ignition coil of claim 1, wherein the inner wall extends upwardly to a position at or above an upper surface of the outer core.

14. The ignition coil of claim 1, wherein the inner wall extends upwardly to a position at or above an upper surface of the coil assembly.

15. The ignition coil of claim 1, wherein the inner wall extends upwardly to a position aligned with an upper end of the outer wall.

16. The ignition coil of claim 1, wherein the inner is integrally formed with the housing and constructed of a plastic material.

17. The ignition coil of claim 1, wherein the inner wall is not integrally formed with the outer core.

18. An method for constructing an ignition coil for an internal combustion engine, the method comprising the steps of:

providing a housing having an outer wall extending around the periphery and an inner wall positioned inside the outer wall, the inner wall defining an inner compartment, the inner and outer walls cooperatively defining an outer compartment therebetween;

providing an inner core, an outer core and a coil assembly, the coil assembly mounted to the inner core, the coil assembly including a primary winding and a secondary winding concentrically positioned relative to each other;

positioning the outer core within the outer compartment;

positioning the inner core and coil assembly within the inner compartment;

and

filling the inner compartment with an encapsulate without filling the outer compartment at the same time.

19. The method of claim 18, further comprising the step of filling the outer compartment with a second encapsulate that is different from the first encapsulate.

20. The method of claim 18, wherein the second encapsulate has more ductility than the first encapsulate.

21. The method of claim 18, wherein the inner wall is integrally formed with the housing.

22. The method of claim 18, wherein the inner wall is not integrally formed with the outer core.

23. The method of claim 18, wherein the inner core includes first and second ends, each end positioned proximate the outer core, and wherein the inner wall extends between the first end of the inner core and the outer core to form an air gap.

24. The method of claim 18, wherein the inner wall extends upwardly to a position at or above an upper surface of the outer core.